INTERIM PROGRESS REPORT

Project Title: ***A Distributed Interactive Access and Resource Interface For Fine-Scale Climate Data***

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I. Preliminary Materials

A. Project Abstract (Text Limit: one page)

Introduction to the Problem: The ability to understand climate at local to regional scales is becoming increasingly important in developing resource management plans and assessing operational outcomes of management decisions, as well as in conducting basic and applied climate research. Through the NOAA-funded Regional Integrated Science and Assessment (RISA) programs and climate services outreach efforts such as the regional climate centers, it has become apparent that stakeholders from a wide range of sectors require an easily accessible fundamental fine-scale climate dataset, educational resources, and a related suite of intuitive, efficient applications tools to best incorporate climate information into their own particular areas of responsibility.

Rationale: Climate can vary dramatically across short distances and over small elevation changes as can the response to such variation. In a direct response to observed impacts of this variability, stakeholders have increasingly pressed for finer-scale climate data and efficient applications tools to better understand and manage the interactions between climate variability and their concerns, be it land management, water scarcity, fire management, agriculture, tourism, utilities, or other important issues. Gridded fine-scale climate data series are an attractive way to supply these needs. While 1km resolution dataset is often considered ideal for resolving local-regional climate variations, such data are still in development. However, the PRISM 4km spatial climate data series is available for the 48 states from 1895-present, and it is well suited to the development of a climate transition product. We propose to develop an interactive distributed web interface to transfer the data, related tools, and user-friendly educational resources to the user community. This proposal is a direct response to many years of requests to the Western Regional Climate Center and the RISAs from agency stakeholders, engineers, recreation interests, forestry experts, land managers, water resource managers, drought response and relief agencies, planners, hydrologists and climatologists. All are asking for fine-scale spatial climate time series and the ability to acquire summary time histories from individual points within specific spatial configurations.

Brief Summary of Proposed Work: Drawing on years of experience in developing fine-scale climate data, regional climate research, RISA-based stakeholder interactions (CLIMAS), and successful operational transfer of climate information to potential users, the University of Arizona, the Western Regional Climate Center/Desert Research Institute, and the Spatial Climate Analysis Service at Oregon State University will collaborate on development, transition, and operational phases of a new distributed interactive data access and resource interface, adaptable to future spatial climate data sets and resource needs. A suite of user-requested tools and educational resources will be created, based on multiple interactions with stakeholder groups, research teams and integrated assessment programs throughout all phases of the project. Programming and content generation will be based on these interactions in both years of the project, as the product is transitioned into operational mode.

B. Objective of Research Project (Text Limit: one paragraph)

We intend to transition results of climate variability research and ongoing development of fine scale gridded climate data to widespread operational use through design and operational implementation of a new distributed interactive data access and resource interface. The interface will be accompanied by a set of user-requested, user-tested analysis tools and educational resources to insure usefulness and user-friendly operations. This WestMap system is will be fully adaptable to future spatial climate data sets and resource needs.

C. Approach (including methodological framework, models used, theory tested) (Text Limit: one page)

The WestMap system consists of three primary interwoven segments, 1) data development and operations; 2) error assessments, data analyses and diagnostics; and 3) data access, visualization and educational resources. Year 1: development of the primary user interface, background server infrastructure, and initial user tools/informational resources.

- Investigate existing web-based sites serving climate data to the public, in particular, means of data access, canned analysis tools, datasets, user display and output options, usability, data formats, content, layout, user specified data capabilities (upload, special request), site security, and source code. Goal: Prototype access and usage design for obvious and easy use by members of different stakeholder communities.
- Designate the 4km PRISM monthly temperature (max, min, mean) and precipitation time series data (100+ years, monthly data) developed at the Spatial Climate Analysis Center as our initial data set (collaborator: Christopher Daly, SCAS/Oregon State University). Prototype has built-in flexibility to include the entire contiguous U.S.; however, initial operational prototype will focus on the Western United States region served by the Western Region Climate Center. Multiple subregions are designated and accessible.
- Website production is being undertaken in an iterative manner, starting with basic layout, and "canned" products, finishing with fully functional and more interactive web pages delivering all the final web products. Specific web-based user interface features underway include:
  - Clickable map (front page) to involve users immediately in retrieving WestMap products
  - Front page maps changeable based on mouse-rollover, regional labels track with mouse
  - Clearly defined drop-down navigational menus and sidebar link menu for product and page access
  - Interactive tools for visualization of error in grid data
  - Underlying user group specific pages, cross-linked to common tools and datasets
  - Graphical and text-based display of data including user tool that will allow user defined data domain (time and space). Tools to plot division average time series; plot a closest to "specified lat/lon" grid point time series are in design stage.

Specific user friendly web features including changeable maps based on mouse-rollover, regional labels that track with the mouse, and drop-down navigational menus that allow users to find products and pages easily have been implemented.

Several programming languages are used to generate prototype components. PHP is used for web page generation, site security, form retrieval of data requests and user feedback. Javascript is used for mouse-over effects, tracking map labels, and drop-down site navigation menus. "On-the-fly" map and data requests use PHP, Javascript or Java, and a form of open source webGIS software, modified for use in the WestMap project. A dedicated server is devoted to generating the "canned" products and the user-requested "on-the-fly" maps, graphs and data. C, FORTRAN, perl, unix/linux scripts and graphical software (GrADS or NCL) are

used to generate these maps and retrieve information from the PRISM database. Flexibility in design, development, and operations extends to use of programming languages and software.

Initial testing phase will involve members of the WestMap Consortium, researchers and stakeholder groups responsible for the genesis of the WestMap endeavor. Phased expansion of evaluation will follow in Year 2 leading to eventual operational release.

D. Description of any matching funds used for this project. (Text Limit: one paragraph)

- UA: PI salary+ ERE +associated IDC in Year 1 and Year 2, $10,870; Travel: $1,400 + associated IDC. UA Total: $ 18,492; Subcontract (Desert Research Institute): Travel: $1,320 per year, Desert Research Institute Total: $2,650. Dr. Chris Daly, PRISM Group, Oregon State University will donate his time and expertise on PRISM climate data as part of the Transition and Operations efforts, 2 weeks each year in advisory capacity, ~$6,000 per year; Total: $12,000 plus costs of PRISM data. This is an in-kind donation and is not reflected in the project cost or cost share totals.
- Many WestMap-related community presentations using a variety of funds (Comrie, Redmond)
- Under funding provided by the DRI Division of Atmospheric Sciences post-doctoral fellow John Abatzoglou has been working with Kelly Redmond to develop methods for developing and presenting climatic time series for use in tracking climate variability and trends in western states, starting with California. Additional funding from the California Energy Commission has enabled Kelly Redmond to assist John in developing new regions for California, based on pattern correlation analysis, which can be incorporated into WestMap.

II. Interactions

A. Description of interactions with decision-makers who were either impacted or consulted as part of the activity; include a list of the decision makers and the nature of the interaction; be explicit about collaborating local institutions. (Text Limit: half page)

Up to this point, most of our energy has gone into developing the technical capabilities needed to make WestMap function. We have received a great deal of input from a wide variety of sources, have a good idea what is needed, and our focus currently is on implementation. This input has come from state climate offices, water managers, the news media, those involved in drought and climate trend monitoring, and fire managers working with CEFA.

Dr. Chris Daly, Spatial Climate Analysis Services, Oregon State University---PRISM data

The WestMap Consortium: researchers and stakeholders associated with University of Arizona/CLIMAS, Oregon State University/ PRISM, Western Regional Climate Center/Desert Research Institute, Scripps Institution of Oceanography/California Applications Project, NOAA Climate Diagnostics Center, and USDA Natural Resource Conservation Service---project conception, ongoing design and content-related discussions

We are about to enter formal alpha testing phases, our next major set of interactions with our user community. Phased testing will guide continuing development and revision of products to best suit stakeholder needs.

See sections II.B, II.C, III.A related project, and III.C for additional information on interaction.

B. Description of interactions with climate forecasting community (i.e., coordination with NOAA climate forecasting divisions, the International Research Institute for climate prediction (IRI), regional or local climate forecasting entities, etc.) (Text Limit: half page)

So far there has been relatively little interaction with this sector. WestMap is concerned primarily with observations and thus with the past and near present. These are of use to the forecasting community to the extent that the past helps furnish a guide for the future, or that detailed spatial or temporal information about the past are needed or useful for the interpretation of climate forecasts.

National Weather Service Tucson--Interface display, content advice, early testing

C. Coordination with other projects of the NOAA Climate Assessments and Services Division (CASD) (i.e., Sectoral Applications Research Program (SARP) Regional Integrated Sciences and Assessments (RISA), or NOAA Climate Transition Program (NCTP) projects) (Text Limit: half page)

We are planning to coordinate these activities with several other NOAA programs. We will be attending the RISA Principal Investigator meeting in La Jolla Feb 27 - Mar 1, 2006. In particular, WestMap is well suited for a cross-RISA activity, as all RISA projects in the western states have a need for this capability, for both general climate monitoring, including drought under the auspices of the National Integrated Drought Information System, and specific projects, such as efforts to improve the utilization of climate information for management of the Colorado River

Climate Assessment of the Southwest (CLIMAS-RISA)---seed money for the Western Climate Mapping Initiative of which this WestMap project is the initial “research to operations” effort.

III. Accomplishments

A. Brief discussion of research tasks accomplished. Include a discussion of data collected, models developed or augmented, fieldwork undertaken. (Text Limit: 2 pages)

In year one, we have developed a prototype web-based interactive access and resource interface to optimize public dissemination and usage of fine-scale spatial climate time series for the western United States. The western U.S. focus reflects the complex climate interactions and diverse geography that make resource management, policy considerations, and climate research challenging in this region. The WestMap interface is links three stakeholder-driven components, 1) climate data development and operations (access, maintenance); 2) error assessment, data analysis, diagnostics, and related tools; and (3) data access, visualization, and educational resources. The 100-year PRISM 4km monthly temperature and precipitation series serve as the initial data archive, updating automatically once in operational mode. Operational user components in design and testing phases are being developed to allow direct stakeholder access to user-specified data and resources most relevant to current needs in a timely manner. These include clickable maps with a variety of subregion options (functional), regional aggregate capabilities, basic statistical analysis, time series visualization, error assessment, and download/print capability (data display- text option functional). Year two will

focus on continued interface development as well as extensive composition of textual resources in support of data access and analysis. Interconnectivity between components will be ongoing throughout the year. Phased prototype testing, currently underway internally, will continue with broader stakeholder participation in Summer/Fall 2007. Operational release of the prototype interface is planned for Fall/Winter 2007.

Interface Development

- Procurement and establishment of PRISM database
  - downloaded, processed, organized and made available for use by the web based interface the available precipitation, max, min, mean temperature series from the PRISM project at Oregon State U.
  - automated update processes constructed to retrieve each new month of PRISM data as it is released.
  - regional division subsets: parse Prism dataset for western United States according to four (initial) pre-determined boundary sets.
  - computation of spatial means for each month of the prism dataset
    - state, county, climate division and Hydrological Unit in the western U.S..
    - updated with the release of each new PRISM grid
    - organized and easily accessible from the web site
- Website construction: WestMap project homepage
  - series of informational links about the project,
  - Map of the western U.S. displaying the latest PRISM grid.
  - Menu to the right of the map
    - user selection tool for PRISM grid view options
      - Precipitation, maximum, minimum, mean temperature
      - Selection of boundary set to display on the map.
  - Clickable Map tools for access to data
    - zoom in and look at map of an individual state
    - select a state, county, climate division or Hydrological Unit.
  - User selection form page (access from front page)
    - verify which area
    - verify time period
    - initial functionality: retrieval of text data for selected area
    - next step: display the data in the graphic form
  - User draw tool: once graphics for the pre-determined boundary sets are in place, the website will incorporate a tool that will allow the user to define, retrieve and display PRISM data according to user-defined areas.

Text Content:

- Data
  - What is Prism?
  - Caveats for use of data?
  - What is a quick look map?
  - What variables are available including subset divisions?
  - Examples of data usage?
  - What data formats are available?
  - Meta Data?
  - Error Analysis?
- Interface Usage (User Tools, Visualization, Analysis)
  - How do I create a (composite, anomaly) map?
  - How do I (download, print, plot) data? Optional formats?

    - How do I plot a time series?
    - How do I calculate (statistics)?
    - What tools are available for quick looks?
- External Links
    - Other climate data sites
    - Educational resources
    - WestMap Consortium
    - NOAA
    - Non-commercial data plotting/ manipulation software
    - General popular weather and climate sites

Near Term Goals

0. Webpage appearance and links
1. Get all basic maps (five layers) functional (mouseover tool)
The five layers: States, Climate Divisions, Counties, Hydrographic Basins, Individual Pixels
Add another layer to encompass special climate divisions generated by other projects
2. Improve the interface plotting tools
3. Refine subregion capabilities
    - Ability to specify Precip/MeanT/MaxT/MinT
    - Start and end year.
    - Number of months to combine, and the ending month.
    - Number of years in running mean, and yes/no plot this.
    - Yes/no plot average.
4. Refine plot options
    - Plot size
    - List the data:
        - mutually exclusive options: A plotted points yes, B plotted points no, C all data in record
        - if A then plot both individual and running means, available for capture
5. Implement graphical lister, GD version, or NCL version, eventually both.
6. Add statistics information, and trends information, to (or below) each graph
7. Add ability to click on multiple areas, and aggregate the values to effectively a larger area (a 4-county area, the entire upper Colorado River Basin.
8. Connect textual content to interface
9. Stakeholder communication for purpose of phased prototype testing.

Project funds were used for travel to DRI in March 2006 to collaborate with the DRI team (H. Reinbold and K. Redmond) on initial prototype design and user tools and to present poster at AGU Fall Meeting 2006 (Glueck).

B. Summary of any preliminary findings (i.e., how this research advances our scientific understanding) (Text Limit: 2 pages)

see also section A immediately above.

Related Projects:

For a related project we have used WestMap to obtain data from all the 4 km grid cells within the state of California and aggregated these up to approximately 750 cells of dimension 24x24 km, then used the PRISM time series to perform an extensive set of pattern analyses using empirical orthogonal functions (EOFs), for every month and season, for precipitation, for maximum, minimum, and mean temperature, and for normalized combinations of all of these, performing rotations to determine an optimum number of climate divisions for tracking the state's climate. The same analysis was performed with about 200 stations. We found that the

resulting patterns were quite similar, and this gave confidence to preferentially using the PRISM data, because the entire state is uniformly covered and because all data are spatially interpolated back to January 1895. We are updating this data set every month.

The purpose of this elaborate exercise was to provide input back to the WestMap project about alternative ways of forming climate divisions that take account of natural tendencies for the behavior of climate in nearby locations to group together. In the western states the topography complicates this issue considerably. These results were used to develop a product called the California Climate Tracker, intended for use by the public, media, legislators and policy makers, agency managers, and the scientific community. This has so far elicited a strongly positive reaction.

We have further spent considerable time looking at ways of portraying time series and of presenting ancillary information. These will be incorporated into the development of WestMap. This capability can be accessed off the "Projects" page of WRCC, and a frames version that permits ready viewing of time series can be found at <www.wrcc.dri.edu/monitor/cal-mon/frames_version.html>. We plan to merge this capability with WestMap as we proceed.

A second version was prepared for the state of Nevada for use by state government in developing legislation to address climate change in the state. A within-state regional analysis similar to that for California has not yet been undertaken, due to lack of resources, but the statewide averages found at the Nevada Climate Tracker, <www.wrcc.dri.edu/monitor/nev-mon/index.html>.

C. List of any papers and presentations arising from this project thus far; please send reprints of journal articles as they appear in the literature.

Comrie, AC, Redmond, KR, Glueck, MG, Reinbold, H, Prototype web tools for the Western Climate Mapping Initiative (WestMap), poster presented at AGU Fall Meeting 2006

Comrie, AC, Redmond, KR, Glueck, MG, Reinbold, H, Prototype web tools for the Western Climate Mapping Initiative (WestMap), poster presented at PACLIM2006

Comrie, AC, Redmond, KR, Glueck, MG, Reinbold, H, Interactive Web-based Access and Analysis Tools for the Western Climate Mapping Initiative (WestMap)---PACLIM2005 poster and oral presentation

Redmond, K, The WestMap Project, oral presentation at CPASW2006

Graphics prepared with WestMap were incorporated into major study released by the National Resource Council on Wednesday February 23, 2006, entitled "Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability." This report has received a great amount of attention in the first few days since its release. These graphs appear as Figure 3-1 and 3-2 and dramatically illustrate both the recent drought and the rising temperatures averaged over the Colorado River Basin (see books.nap.edu/openbook.php?record_id=11857&page=61> and <books.nap.edu/openbook.php?record_id=11857&page=60>).

Graphics that trace back to WestMap and the data sets it has made available are routinely incorporated into talks and presentations, the latest being an update on "Climate Change in Nevada" given at the Nevada Water Resources Association Annual Meeting in Reno on February 21, 2006, where graphics from the California and Nevada Climate Trackers were

shown.

D. Discussion of any significant deviations from proposed work plan (e.g., delayed fieldwork due to late arrival of funds). (Text Limit: one paragraph)

Start of subcontract (prototype technical design/ development) was delayed significantly due to late arrival of funds from NOAA resulting in a 6 months offset from main project start date. Allowing for this, the project is close to the original time line specified at the start of the project.

IV. Relevance to the field of human-environment interactions

A. Describe how the results of your project are furthering the field of understanding and analyzing the use of climate information in decisionmaking (Text Limit: one page)

We are providing the climate information, and ways to analyze that information, for a wide range of decision makers across the span of human-environment interactions. Our user friendly data options, tools, and educational resources (tutorials, usage caveats, error assessment, suggested uses, metadata, external links) will encourage wider use of fine scale climate information and greater incorporation of credible information in climate sensitive decisionmaking efforts.

There are five key fields in which WestMap-related products are being utilized already, or will soon be. These include:

- drought mitigation/monitoring
- climate variability monitoring and diagnostic studies
- water management
- global change modeling/assessment
  forecasts (initial conditions) and downscaling of forecasts (limits of predictability, model verification)

Selected specific areas of research concern for which the WestMap interface will be useful:

- fine scale topographic variations
- extensive high elevation mountain ranges
- deserts
- coastal boundary regions
- interior valleys
- rain shadows
- data availability (time and space, also access)
- overcoming poor station data distribution

B. Where appropriate, describe how this research builds on any previously funded CASD research (i.e., through NSF, EPA, NASA, DOE, NGOs, etc.) (Text Limit: half page)

CLIMAS (University of Arizona RISA project): CLIMAS provided initial seed money for the establishment of WestMap: the Western Climate Mapping Initiative and subsequent development of the WestMap prototype interface NCTP proposal. Now independently funded through NCTP/TRACS, our project has maintained a strong collaborative link with CLIMAS, which is now serving in an advisory capacity as a member of the broader WestMap consortium. Our project is a direct result of stakeholder-researcher interactions communicating the need for the type of climate information and resources we are transitioning to operational status.

See also Section III.B and C.

C. How is your project explicitly contributing to the following areas? (Text Limit: one paragraph per relevant area)

1. Adaptation to long-term climate change

- Regional studies of precipitation variability in the Western States-WRCC, California and Nevada
- Resources for vulnerability analysis in Southwestern United States (CLIMAS)
- Natural resources management and monitoring (USGS, USFS)

2. Natural hazards mitigation

The interface being developed will provide access to fine scale climate data that will allow monitoring of the potential of natural hazards, e.g., heat and drought. Data will be accessible in map and time series format to allow time-space studies of past natural hazard occurrences for the purposes of planning for and mitigation of future hazards.

3. Institutional dimensions of global change

Our project is concerned with transition of research knowledge and tools to operational implementation. We are creating tools and resources that will be useful for a wide range of users who monitor climate and make decisions or develop policies based on climate considerations.

4. Economic value of climate forecasts

The historical series of gridded climate data (point and 2D in time) can be incorporated into interdisciplinary models that allow stakeholders to assess potential costs, risks, and vulnerability associated with climate variability.

5. Developing tools for decision makers and end-users

The primary focus of the project is development of a stakeholder driven user-friendly web based interface to provide access to data and related resources for use by a wide variety of stakeholders having interests in regional climate variability. The interface is designed to allow user-selected data access through clickable maps (several commonly requested subregions) and drop-down menus. The front page contains a quick look of most recent data and the ability to see this data in canned subregion divisions. Accompanying interactive analysis tools allow graphic display of maps, time series of data, and plots of time series. This is being expanded in the next year to allow manipulation of data into composite and anomaly form. Additional resources include metadata, user tutorials, data caveats, and external linkages. Multiple options for data download will be built in. Special user requests will be addressed as need arises initially.

6. Sustainability of vulnerable areas and/or people

Temperature and precipitation data accessed through the interface can be used to determine past and present climate variations for specific areas in the western United States. As the data is accessible in gridded format, users can incorporate it as a layer in a geospatial studies of particular regions or groups of people. Time series and data grids can also serve as initial conditions in interdisciplinary models used to explore sustainability.

7. Matching new scientific information with local/indigenous knowledge

By making this fine scale gridded climate data and related user tools easily accessible to a broad stakeholder community, this interface provides an opportunity for many new collaborations and emergence of new understandings. At a resolution of 4 km, the 100-year+ long data series lend themselves well to studies of local regions as well as studies of interrelationships between historical record and climate data record. At present, the interface includes spatial subregions of US West, state, climate division, county, hydrologic unit, and single pixel with more to come before official release. The potential exists for special region request on a case-by-case basis.

8. The role of public policy in the use of climate information

The goal of this project is to develop an operational data access and resource interface open to all of those with an interest in regional-local scale climate variability. It is our intent that the material contained in the system be as openly accessible, user-friendly and relevant to the user community as possible. In the spirit of open access, we welcome suggestions and comments from our user community. We will retain an internal R & D role for general ongoing site maintenance and improvements. We will also address a small, secured special request capability to allow for situations where this might be deemed critical. The project is a model of a highly stakeholder driven resource and it is our hope that public policy will allow us to maintain this valuable collaboration.

9. Socioeconomic impacts of seasonal and decadal climate variability, and climate change

see above sections 1-8.

10. Other (e.g. ways of communicating uncertain information)

A segment of the project deals directly with data uncertainty and caveats for data use. We are compiling tutorials to explain what the data is, how it was developed, how it might be best used and to address the concepts of data error in time and space. A metadata section will be provided. The interface will also provide tools that allow users to explore data visually in the form of maps, time series plots, and data files. All formats are printable and downloadable in digital or graphic format. Compilation of additional educational resources and external linkages is ongoing. The data description and resource sections of the interface will be a major activity in our second year**.**

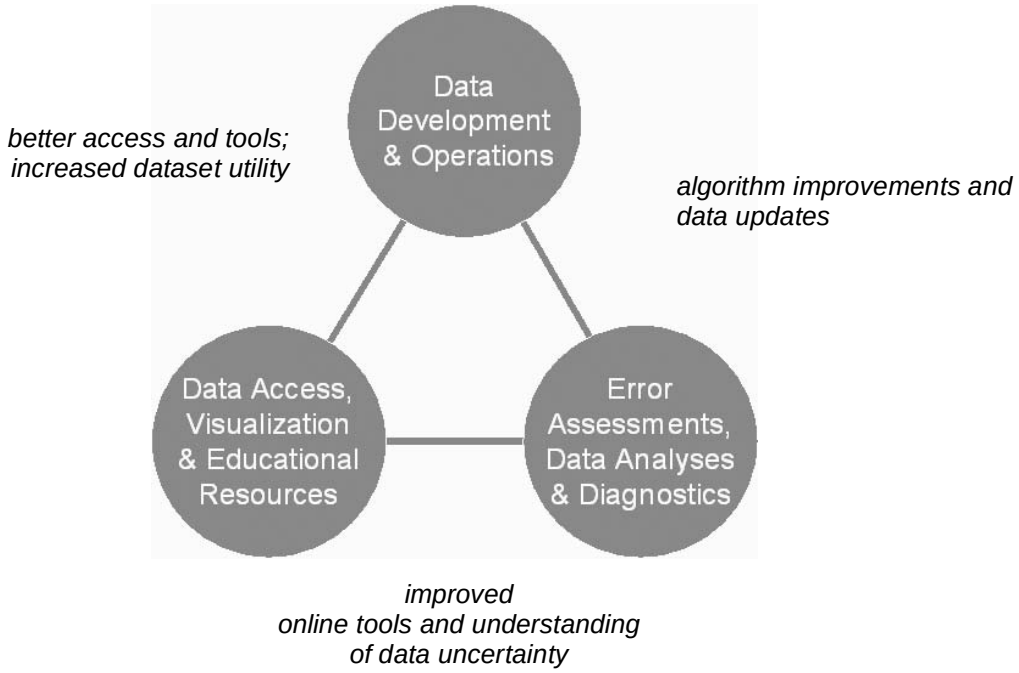
Some specific areas of data analysis/data diagnostics for which the WestMap interface and resources will be quite useful include:

- fine-scale data response to large-scale atmospheric processes
- critical gaps in data coverage
- episode monitoring applications (e.g., drought)
- sub-regional climate variability
- possible climate forecast model implementations of WestMap
- data consistency versus accuracy
- data assimilation and mapping
- expert/lay perceptions of climate information and delivery
  educational needs

V. Graphics -- Please include the following graphics as attachments to your Report if appropriate:

A. Graphic depicting the overall project framework/approach.

a. Our project logo

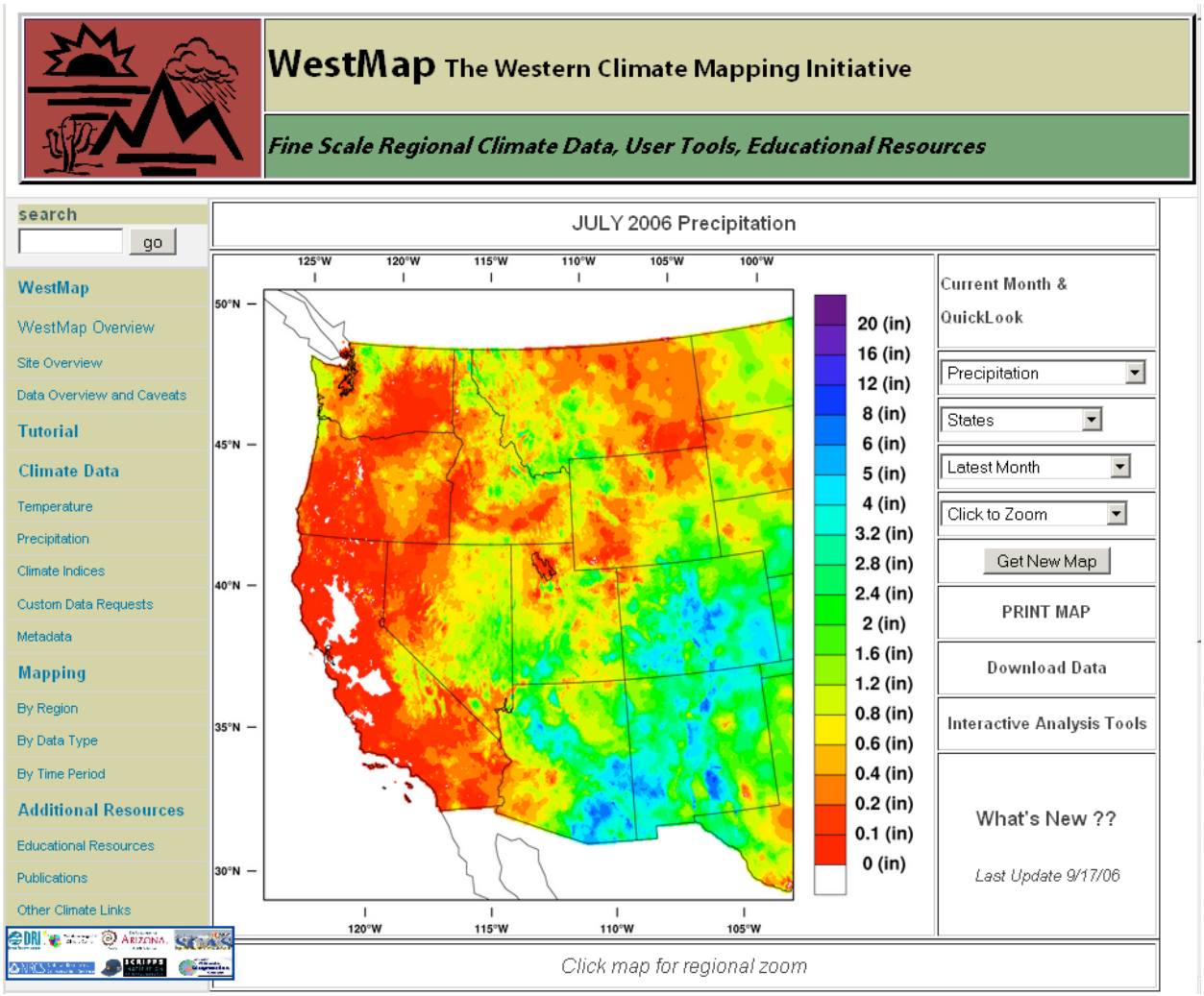


b. Conceptual Linkages for WestMap Interactive Data Access and Resource Prototype

c. Data Access and Resource Interface Prototype Design

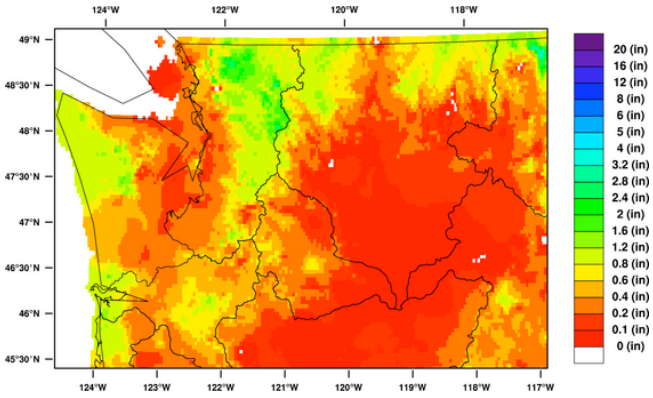
Grey: functional, pre-release; Green: coming next; Red: follows green; Yellow: last stage before operational release

B. If appropriate, graphic(s) depicting any key research results thus far.

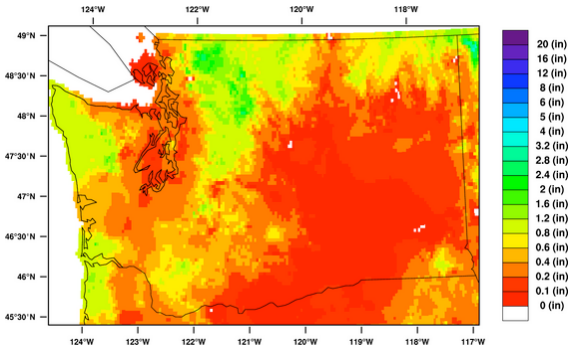


Graphic 1: Prototype WestMap interface screen as it would appear to users.

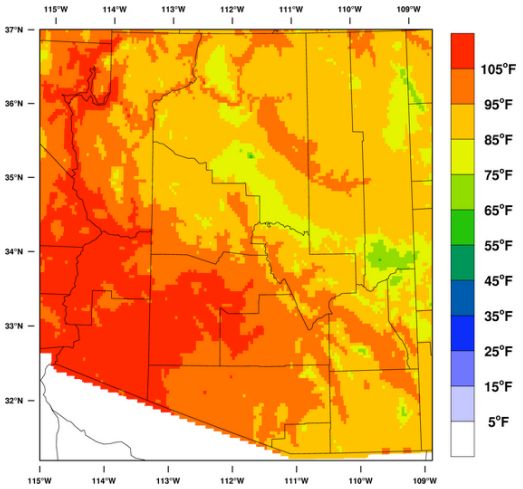
Graphic 2: Display and Analysis Options from the Interface



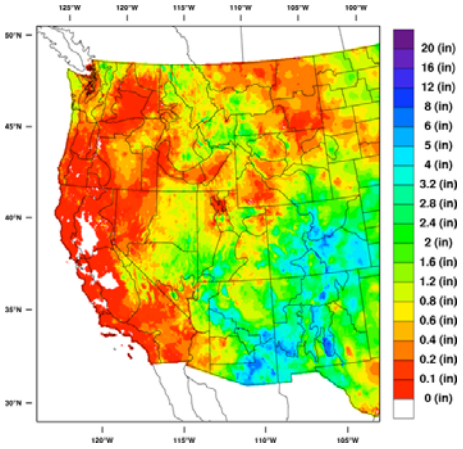
2a: HUC Washington with HUC (hydrologic units) divisions- Precipitation



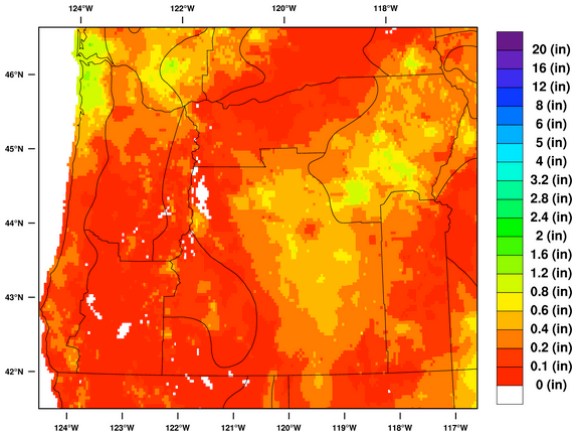
2b: Washington (state subregion)- precipitation



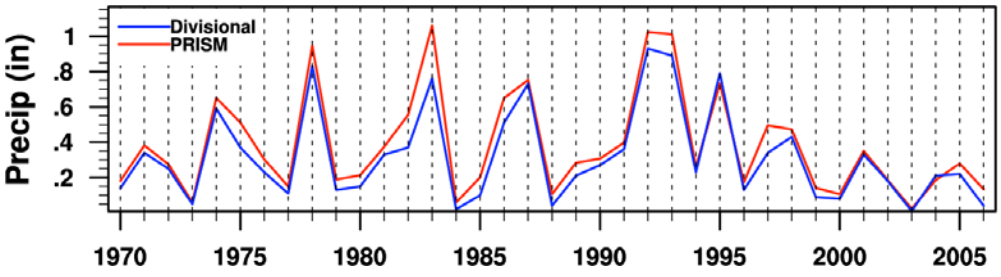
2c: Arizona w/county divisions- maximum temperature



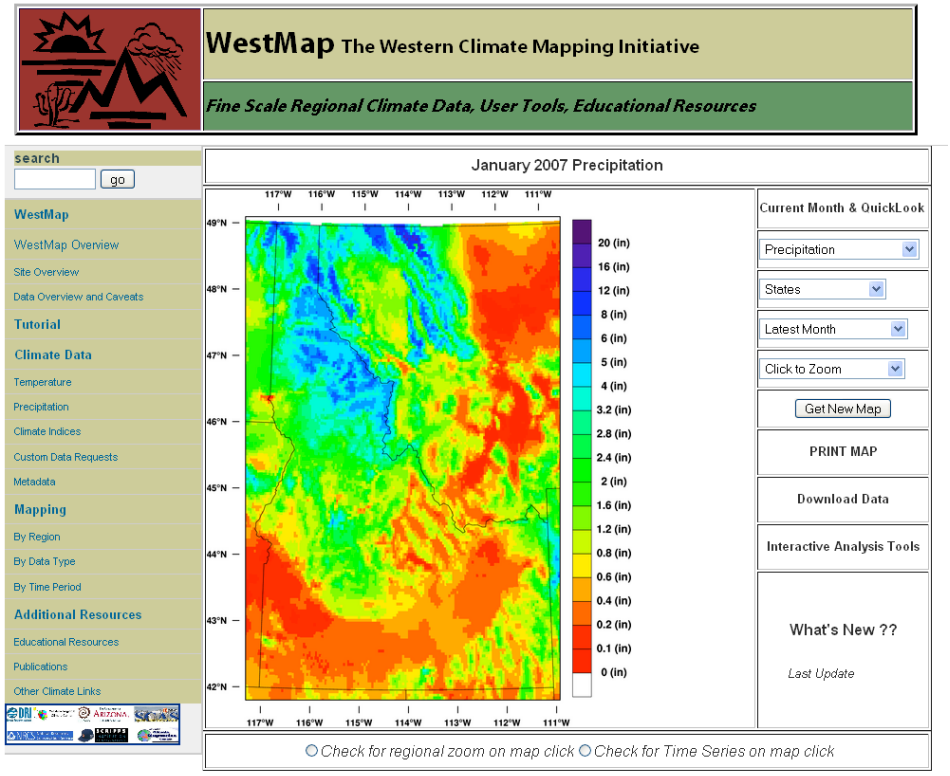
2d. Western Region w/climate division boundaries—precipitation



2e: Oregon w/climate division boundaries---precipitation



2f. Oregon Climate Division 6—Comparison of division data and PRISM---Precipitation July 1970-2006



Plot time series history of monthly divisional precipitation or temperature.

More details about this program

Boundaries: Climate Divisions

To access state-wide averages, use the division pull-down.

Idaho | 01 - Panhandle | Get Timeseries (Text only for now, plots coming soon)

Select the quantity you wish to plot

◉ Precipitation ○ Mean Temperature ○ Max Temperature ○ Min Temperature

Enter the Beginning year: 1990 Enter the Ending year: 2004

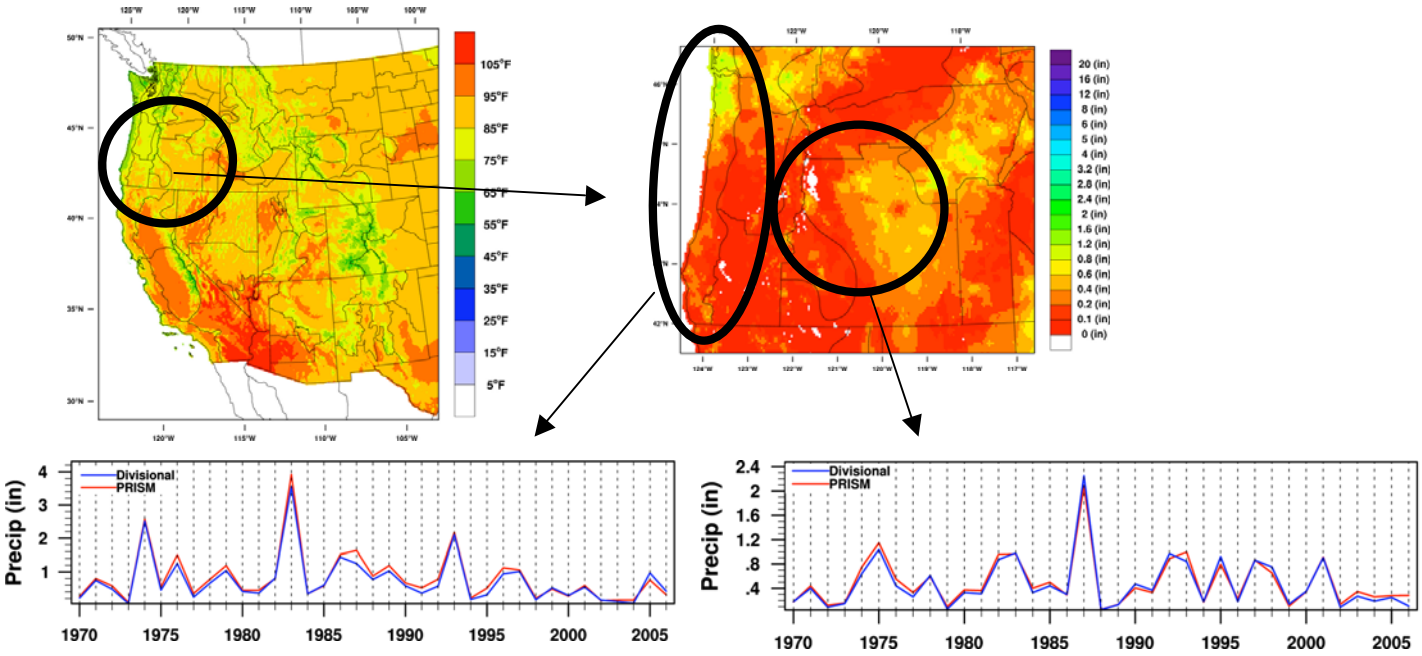
Monthly Mean Precipitation for Idaho -- Division 01 (inches)

YEAR	MONTH	TEMP
1990	01	7.77
1990	02	3.67
1990	03	1.65
1990	04	2.33
1990	05	4.16
1990	06	3.36
1990	07	1.73
1990	08	1.88
1990	09	0.14
1990	10	4.80
1990	11	5.53
1990	12	4.38
1991	01	3.50

2g. Options for data access via Interface clickable map or dropdown menu

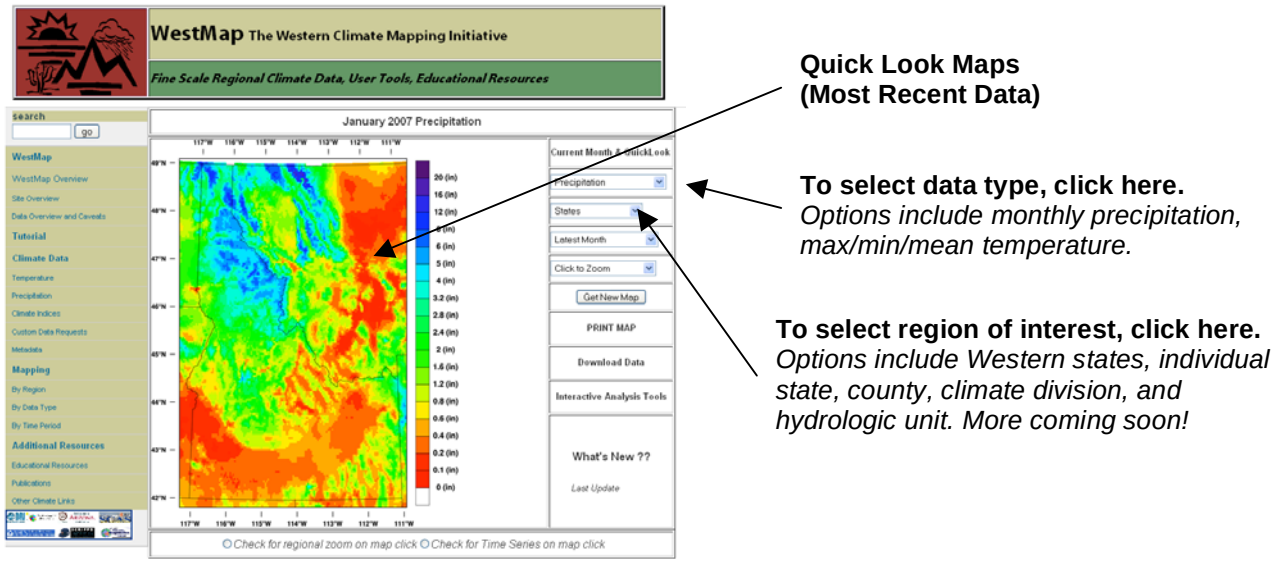
Graphic 3: Educational Resources (to date- 2/07)

3a. Data Explanation
Evaluation Tools



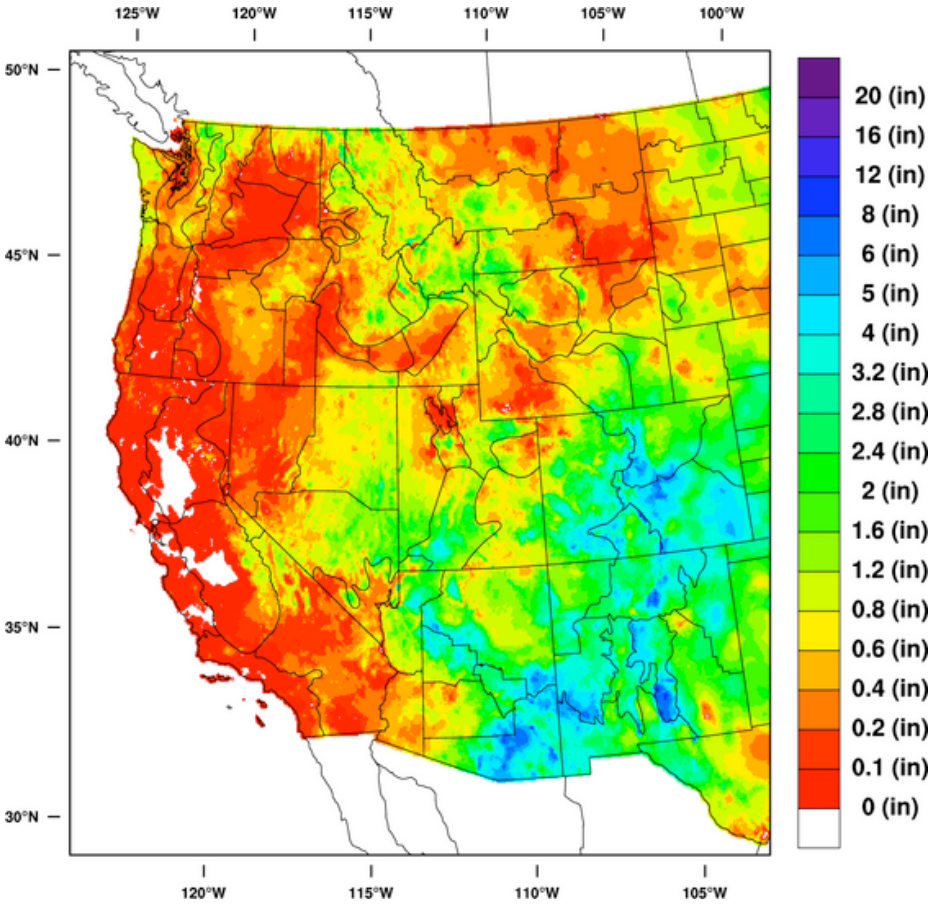
An example of data evaluation: a comparison of Prism data to regional climate division data for two climate divisions in Oregon.

3b. User Tutorial



An example of a basic operation tutorial explaining options for Quick Look maps on front page of prototype.

A. Map of region(s) covered by study (if applicable).



WestMap Interface map region (as currently defined-2/07)

D. Photographs from fieldwork to depict study environment.

N/A

VI. Website address for further information (if applicable)

http://cefa.dri.edu/Westmap/